New Specification

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Higher Tier

[GSD12]

GSD12

MONDAY 12 NOVEMBER 2012, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Questions **1(d)(i)** and **8**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Complete the table about food tests.

Food type	Reagent used to carry out food test	Initial colour of reagent	Final colour for a positive result
Fat		Clear	
Protein			Purple

[4]

(b) Explain why obesity levels have increased greatly in the United Kingdom and many other countries in recent years.

_____

_____

_____ [2]

(c) Name the component of an unhealthy diet that can cause

high blood pressure. _____

diabetes. _____ [2]

(d) (i) Paul read in a magazine that orange juice that has been freshly squeezed from oranges contains more vitamin C than the processed orange juice purchased in cartons. Paul wished to investigate this.

His teacher provided him with a dropper, graduated cylinder, test tubes, the two different orange juices and DCPIP solution. Describe an experiment that Paul would carry out to test the claim that freshly squeezed orange juice contains more vitamin C than processed orange juice.

Give one factor that needs to be controlled to make the test a valid (fair) one.

In this question, you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

(ii) Explain why it would have been better for Paul to use a syringe rather than a dropper in this investigation.

[1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** Explain the ecological term habitat.

_____

_____ [1]

(b) The table shows the percentage of different invertebrate groups present on the ground, in the vegetation and in the air above the vegetation in a grassland.

Area where found	Invertebrate group/%			
	Spiders	**Flies**	**Beetles**	**Bees**
On the ground	67	20	7	30
In the vegetation	33	37	52	26
In the air	0	43	41	44
Total	100	100	100	100

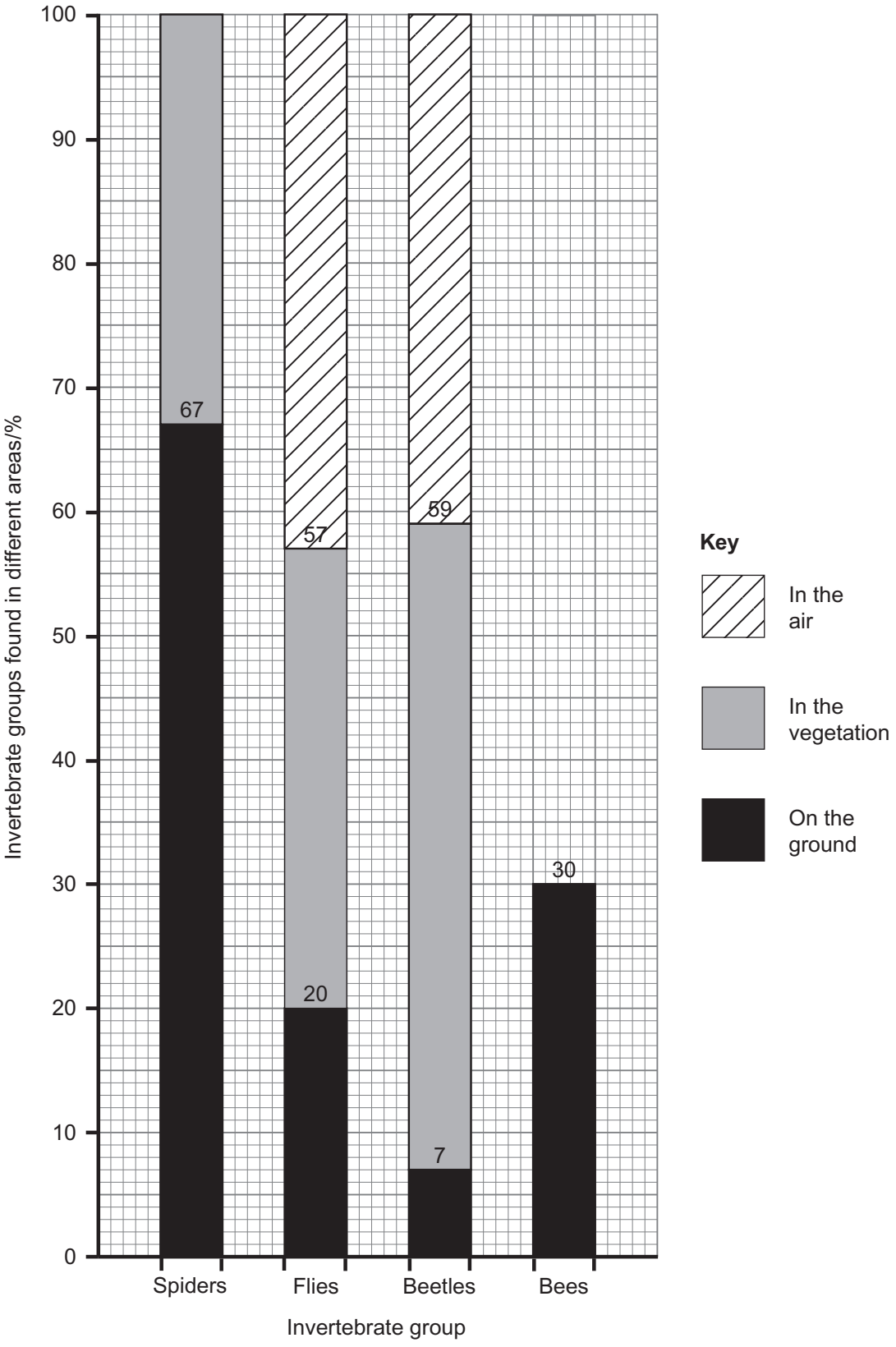
© J W Garvin taken from Skills in advanced biology. Vol. 1 Dealing with data by J W Garvin, published by Stanley Thornes Ltd, 1986

Suggest a suitable sampling method for collecting invertebrates

on the ground. _____

in the vegetation. _____ [2]

(c) Complete the bar chart to include the figures for the bees.



[2]

Examiner Only

Marks	Remark

(d) Use the bar chart to state which invertebrate group cannot fly.

_____ [1]

(e) Yellowhammers are small birds found mostly in the east of Northern Ireland. The yellowhammer chicks feed on insects, while the adult birds feed on barley and wheat seeds.

If the grassland, referred to in part **(b)**, was sprayed with an insecticide (a chemical that kills insects), explain the impact on the population of yellowhammers.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

3 The table gives information on some sources and amounts of greenhouse gas (GHG) emissions in the United Kingdom for the years 2000 and 2010.

Source	Amount of GHG emissions/ million tonnes		Percentage change, 2000–2010
	2000	2010	
Generating Electricity	220	205	
Transport	120	114	–5
Business	110	90	–18
Residential	91	89	–2
Agriculture	58	51	–12

(a) Complete the information in the table by entering the missing value. (Show your working.)

[2]

(b) Describe the general trend for the amounts of GHG emissions for all sources over the period 2000–2010.

_____ [1]

Examiner Only

Marks	Remark

(c) The table below shows the cost of generating electricity from different sources in the United Kingdom and shows whether the source produces carbon dioxide.

Carbon dioxide is a greenhouse gas. Scientific research suggests that an increase in levels of carbon dioxide leads to global warming.

Source	Cost per unit of electricity/p	Carbon dioxide produced
Gas	2.2	Yes
Coal	2.5	Yes
Wind	5.5	No
Wave	6.6	No

© RenewableUK

Use the information in the table to argue why there is controversy about using renewable energy (wind and wave) as a solution to global warming.

_____

_____

_____

_____

_____ [3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 **(a)** Describe and explain the function of digestive enzymes.

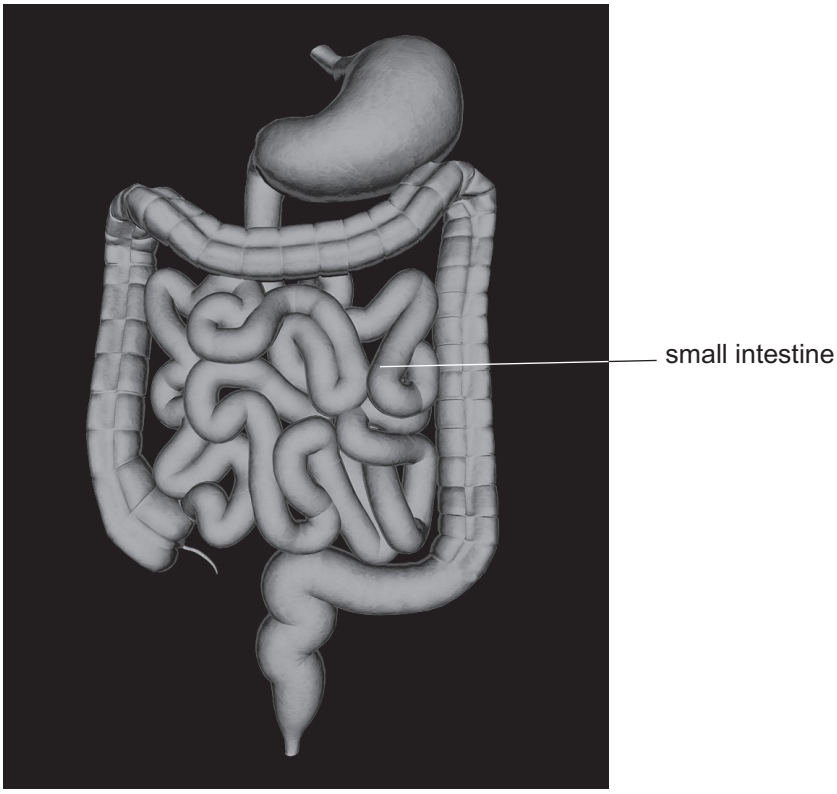
_____

_____

_____

_____ [2]

(b) The image shows part of the digestive system.



© PASIEKA / Science Photo Library

(i) Using only the information in the image give **one** adaptation of the small intestine for absorption.

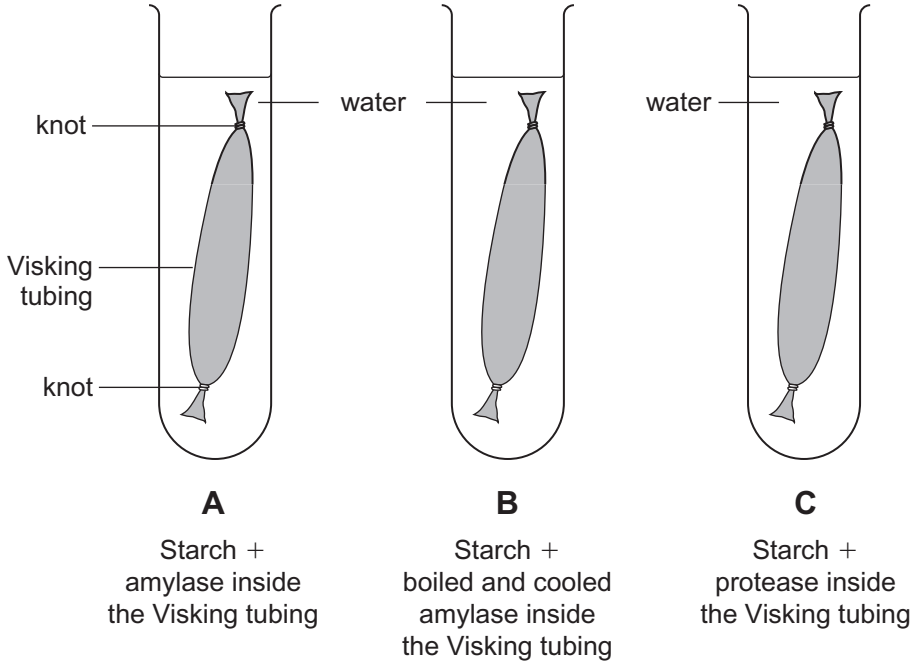
_____ [1]

(ii) Give another adaptation of the small intestine for absorption, that is **not** shown in the diagram.

_____ [1]

Examiner Only	
Marks	Remark

(c) The diagram shows apparatus and materials used by a student to investigate the effect of two digestive enzymes, amylase and protease, on starch.



Visking tubing allows small molecules (e.g. glucose) to pass through but not large molecules (e.g. starch).

The experimental set-up was left for 30 minutes. The student then carried out the Benedict's test on the liquid outside the Visking tubing in each of the boiling tubes **A**, **B** and **C**.

(i) Describe and explain the result the student obtained for the liquid in

tube **A** _____

_____

_____

tube **B** _____

_____

_____ [4]

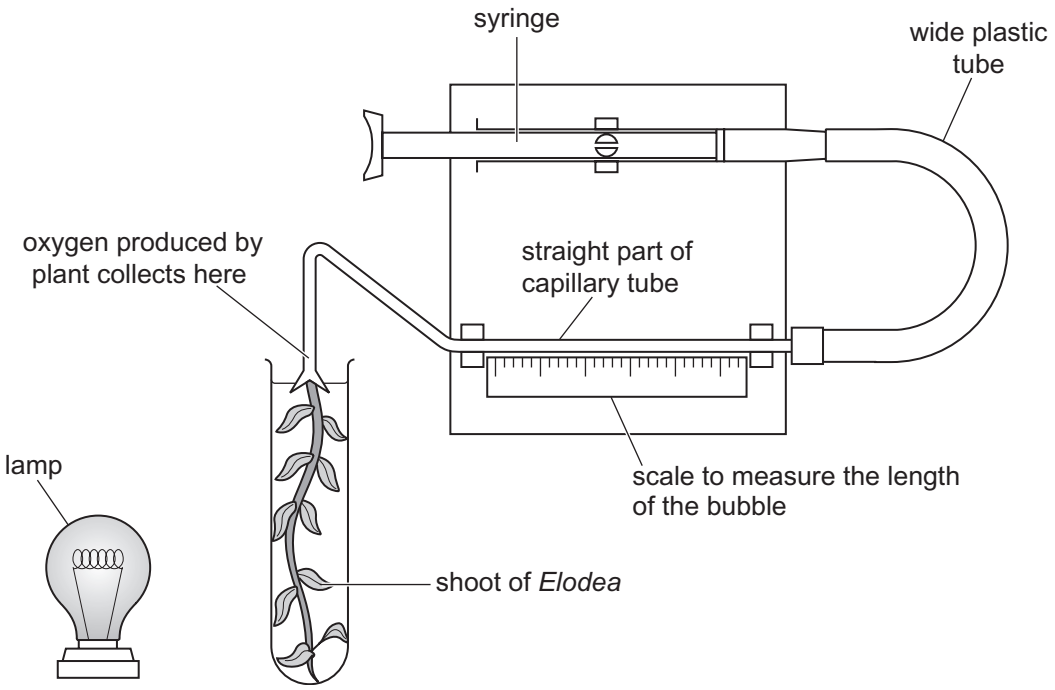
(ii) Explain why there was a negative result for the Benedict's test in tube **C**.

_____

_____ [1]

5 The apparatus shown below was used to investigate the effect of light intensity on the rate of photosynthesis in an aquatic plant (*Elodea*).

The light intensity available to the plant depends on the distance the lamp is from the plant. As the lamp is moved away from the plant, the light intensity available to the plant decreases.



The lamp was placed 10 cm away from the *Elodea*.

The *Elodea* was left at this light intensity for 5 minutes.

The oxygen produced by the *Elodea* over the next 10 minutes was drawn into the straight part of the capillary tube using the syringe.

The length of the oxygen bubble produced in these 10 minutes was measured.

The procedure was carried out three times and the average length of the oxygen bubble was calculated.

The experiment was repeated for six other distances.

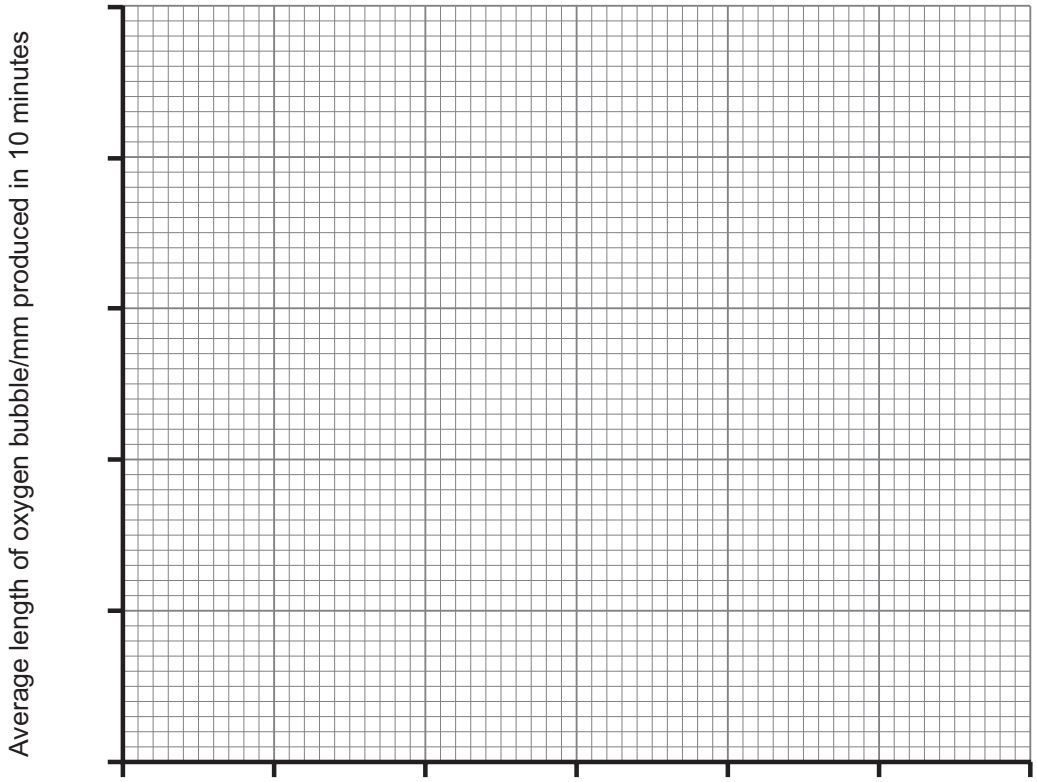
The results are given in the table.

Distance of the lamp from the *Elodea*/cm	**Average length of oxygen bubble produced in 10 minutes/mm**
10.0	43
12.5	43
15.0	43
17.5	28
20.0	21
25.0	11
30.0	7

Examiner Only

Marks	Remark

(a) On the axes below, plot a line graph of average length of oxygen bubble against distance of the lamp from the *Elodea*.



[4]

(b) Describe the trend shown in your graph.

_____

_____

_____ [2]

(c) Explain the trend shown in the graph.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

(d) Name two variables that must be controlled in this experiment to ensure valid results are produced.

1. _____

2. _____ [2]

(e) Not all of the oxygen produced in photosynthesis will be collected by this method. Suggest a reason for this.

_____

_____ [1]

Examiner Only	
Marks	Remark

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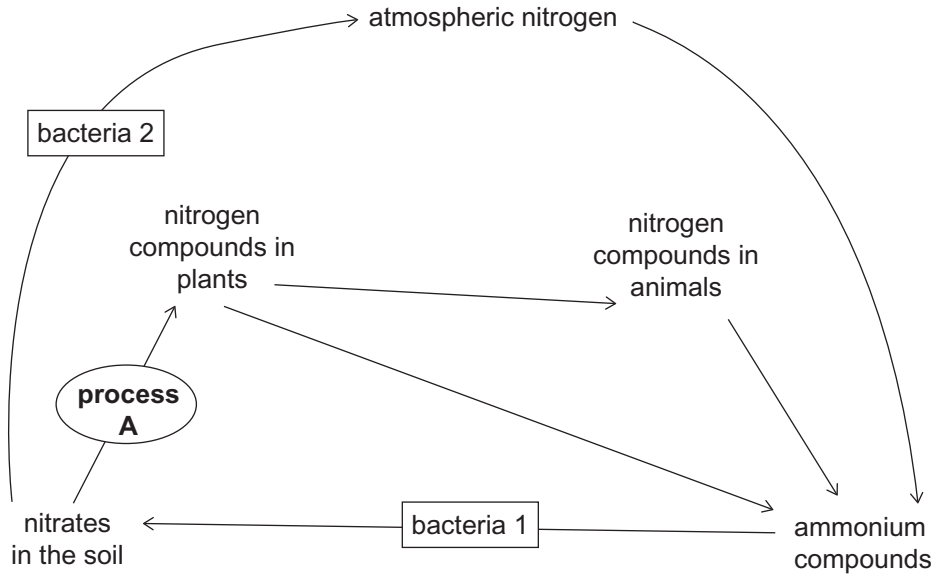
(Questions continue overleaf)

6 The diagram shows part of the nitrogen cycle.



(a) Use the diagram and your knowledge to answer the following questions. Name bacteria types 1 and 2.

bacteria 1 _____

bacteria 2 _____ [2]

(b) Process A is the uptake of nitrates by plant roots. Describe and explain this process.

_____

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

(c) Nitrates are soluble and can be washed out of the soil (leached) and enter rivers. This causes excessive growth of aquatic plants and algae in the rivers. Explain how the death of these aquatic plants and algae can result in reduced biodiversity of aquatic animals.

_____

_____

_____

_____

_____ [3]

(d) Name one nitrogen compound found in animals.

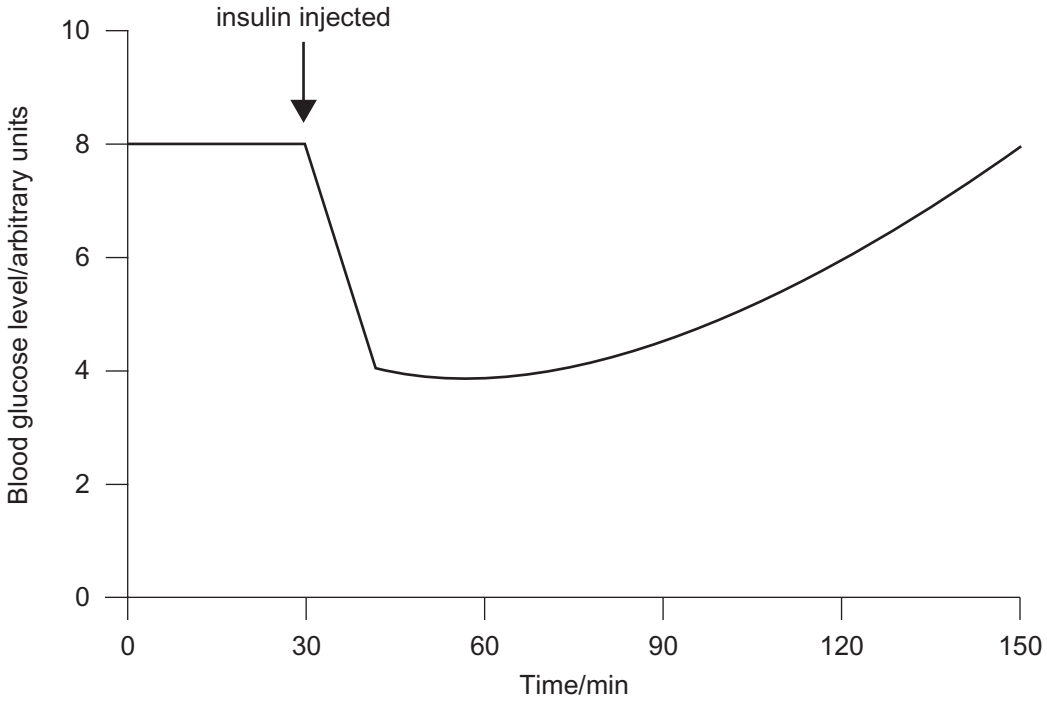
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

7 The hormonal system is one of the two communication systems in the human body. Hormones are chemical messengers that bring about a response in a target organ.

Insulin is a hormone that controls blood glucose levels. The graph shows the effect of an insulin injection on the blood glucose level of a person with diabetes.



Use the information given and your knowledge to answer the following questions.

(a) Name the target organ for insulin.

_____ [1]

(b) Describe how insulin reduces blood glucose level.

_____

_____

_____

_____ [2]

The other communication system is the nervous system.

Examiner Only	
Marks	Remark

(c) Give **two** ways in which communication by the nervous system differs from communication by the hormonal system.

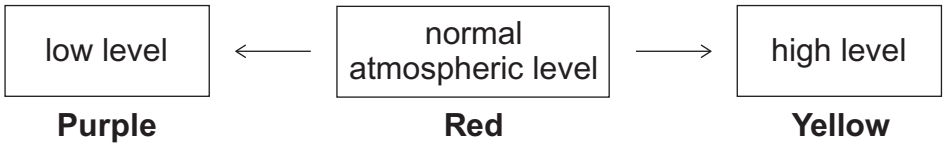
1. _____

_____

2. _____

_____ [2]

8 A scientist investigated gas exchange in tomato plants growing in a glasshouse. He placed test tubes of hydrogencarbonate indicator in the glasshouse. He recorded the colour of the indicator over a 24 hour period. The diagram shows how hydrogencarbonate indicator changes colour with different levels of carbon dioxide.



Describe and explain the results he would expect to obtain at midnight, 8 am (dawn) and 2 pm. Your answer must include the colour changes at the three times.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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